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ABSTRACT

This study of factors that block computer implementation in classrooms tested four hypotheses about the attitudes of preservice and inservice teachers toward scheduling arrangements and instructional use of computers in their classrooms. A semantic differential survey instrument was used to measure the attitudes of 36 Washington State University graduate students, who were surveyed as a sample of inservice teachers, and 37 undergraduate students, who served as a preservice sample. Demographic factors examined included years of teaching experience, previous involvement with computers, and whether the teachers were (or intended to be) subject specialists or classroom teachers. Analyses of the data indicated that both inservice and preservice teachers have positive attitudes toward the computer as a classroom tool and toward the logistics of classroom use of computers. In both cases, however, the attitudes of preservice teachers were found to be more positive than those of inservice teachers. The data provided support for three of the four hypotheses. A copy of the questionnaire is appended. (8 references) (MES)

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TEACHER ATTITUDES TOWARD COMPUTER USE IN THE CLASSROOM

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This paper was prepared for presentation at the Annual Pacific Northwest Research and Evaluation Conference, Washington Educational Research Association, Seattle, WA, March 24 & 25, 1988.

Computer technology has come here to stay, and it is pervading our daily lives from all angles. At the grocery checkout counter, the tellers at the bank, even the library circulation desk, everywhere one looks computers have infiltrated our lives. Our students of today are growing up in a world where computer technology is a part of everyday living. Has this computer technology infiltrated the classroom or not?

One needs to look in just a few classrooms to see computer technology has entered some fully, others less so, and most not at all.

Historical Perspective

A historical perspective invites one to look back at the innovative technology of the past to find any patterns which may be applied to the present. The past technology would include: chalkboards, textbooks, motion pictures, radio, overhead projectors, and television.

Of all of these innovations, the chalkboard and textbook are the most pervasive in the classroom.

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measure of pervasiveness being the number of classrooms which have these and teachers who use them. Overhead projectors are also widely used but generally in more advanced levels of instruction rather than in elementary grades.

In the past, motion pictures, radio, and television were all heralded as great innovations for instruction and would replace the teacher for efficiency of instruction. Look around today and it can be seen that it is not so. Why did it not occur?

Cuban (1986) analyzed this issue in Teachers and Machines through a reexamination of the research around each of these "great" innovations. For motion pictures, he listed four factors which were considered obstacles blocking their use in classrooms. The obstacles were as follows: (1) lack of teacher skill in their use, (2) cost of the material and its upkeep, (3) inaccessibility of the equipment, and (4) appropriate match of the film to the class. The obstacles for use of radio were very similar to motion pictures. Equipment and reception were the most crucial factors, but program content and scheduling were also major factors. Instructional television also had some barriers. These barriers were most often cited as: inconvenient broadcast time, no equipment, no time, and inconvenient facilities. All these barriers to use can be summarized in

that the innovative technology was not a simple, flexible, and accessible tool.

If the six technological innovations are examined from the perspective of a simple, flexible and accessible tool, it can be seen that the chalkboard and textbook fit this classification. The overhead projector also fits this classification but to a lesser extent. Motion pictures, radio, and television are not simple, flexible and accessible tools when applied to the classroom. Where does the computer fit into this classification?

Many researchers have been addressing this issue from different perspectives. Chen, Anson & Regev (1981) investigated the structural impediments of computer implementation. They focus on problems of a social nature in gaining the acceptance of computer use in schools and recommend integration of computers into the existing structure of schools. Swadener & Jarrett (1986/87) compiled a list of current uses of computers in secondary schools and found the uses were very specialized and isolated.

More researchers have focused on teacher and student attitudes toward computers. Lichtman (1979) concluded that administrators may provide the computers and programs but the teachers may not implement their use in the classroom due to their perceived dehumanizing aspect. Madsen & Sebastiani (1986) studied teacher attitudes toward computers and found them to be positively correlated with teacher

knowledge defined as computer literacy. Abdel-Gaid, Trueblood & Shrigley (1986) also perceived teacher attitude toward microcomputers as the central issue in computer use. To this end, they developed an attitude scale for science teachers based on a Likert scale. A review of computer uses in social studies was completed by Massialas & Papagiannis (1987). They describe some naturalistic studies which indicate the complexity of the computer/curricula relationship which involve differences in attitude, use and procedural issues. The data were from cases studies so the generalization of the findings is limited.

Finally, most work has been done in researching students perceptions about working on and with computers. This literature can be summed by a quote from Lawton & Gerschner (1982, p. 51). "Overall, the data appear mixed. It is noted that some students liked computers, that some students did apparently learn from computers, that other students apparently did not learn from computers, and that some school districts appeared to be committed to computers and computerized instruction while others were not." This really sums the research to date on computers in school. This is reflective of the literature from the previous technological innovations--radio and television.

Looking back at the criteria for implementing a new technology developed from the historical perspective, these studies have not addressed all aspects. Still to be

answered is the question, "Is the computer considered by teachers to be a simple, flexible and accessible tool?"

Methodology

The problem examined in this study is to determine the factors which block computer implementation in classrooms. The perspective will be from teachers' attitudes toward computer use in their classrooms as attitudes toward an innovation appear to be the major influence.

Hypothesis 1: Teachers will have a positive attitude toward the computer as a tool in a classroom.

Hypothesis 2: Teachers will have a negative attitude toward the logistics of classroom use of computers.

Hypothesis 3: Pre-service teachers will have more positive attitudes than in-service teachers toward the computer as a tool in a classroom.

Hypothesis 4: Pre-service teachers will have more positive attitudes than in-service teachers toward the logistics of classroom use of computers.

Instrument. To determine the factors which block computer implementation in classrooms, a semantic differential survey instrument was developed to measure teachers' attitudes toward computer use in classrooms. For the survey, the attitudinal object was divided into the logistics (scheduling) and use of computer as a tool in the classroom. See Appendix A for actual form used. To get a score for each question, the responses were translated to a

number and totalled. A high score indicates a positive attitude and a low score indicates a negative attitude.

Sample. The population sample for this study consisted of convenience sample of Washington State University students. Two graduate level class were surveyed in Vancouver and Tri-Cities for the sample of inservice teachers which resulted in 36 respondents who are currently employed in schools. Two undergraduate (senior) classes were surveyed on the Pullman campus which resulted in 37 respondents who are currently pre-service teachers in their senior year.

Procedures. The survey forms were distributed and collected from the selected classes during a pre-arranged class time either by the class instructor or the investigator. A summary of the demographic data was compiled. Means and standard errors were calculated and t-tests performed on the data gathered to test the hypotheses. On a seven point scale used in this survey instrument, the mid-point is 4.00. Any means greater than 4.00 indicate a positive attitude and means lesser than 4.00 indicate a negative attitude.

Results and Discussion

Demographics. The design of the research provided for a even distribution between preservice and inservice teachers. A frequency distribution of grade level indicates the respondents were evenly distributed between elementary

teachers. Fifty-eight percent of the respondents indicated they were or intended to be area specialists and the residual indicated responsibility for a self-contained classroom. Pearson's correlation coefficient was calculated on the responses for the two questions regarding personal and professional use of the computer. There was a significant correlation ($p < .001$) between these two questions for both preservice and inservice teachers; therefore, only the responses to the professional use question were utilized in the subsequent calculations.

Crosstabulations were used to determine the variations in responses to use of the computer by years of experience. Three categories were used: preservice, 5 years or less experience, and more than five years experience teaching. For the preservice teachers, the elementary respondents indicate more involvement with computers than the secondary respondents. This separation is also true for self-contained classroom teachers having more involvement than subject specialists. For the teachers with five or less years of experience, there is an even distribution of responses in involvement with computers as far as elementary/secondary and all/subject divisions. In all these cases, the respondents indicate a low involvement. The teachers with more than five years experience indicate a high involvement with computers.

This demographic information indicates that there was an even distribution of elementary and secondary respondents as well as preservice and inservice teachers. This distribution is beneficial as these different groups appear to have different levels of involvement with computers.

Means. The two groups, inservice and preservice teachers, were separated to calculate the mean score of the question on scheduling and on the computer as a tool. For the preservice teachers, the question on scheduling resulted in a mean score of 4.86 with a standard error of 0.13. The question on the computer as a tool resulted in a mean score of 5.16 with a standard error of 0.16. These results show that the preservice teachers surveyed indicate a positive attitude toward scheduling student use of computers and using computers as a tool.

The inservice teachers' responses resulted in a mean of 4.34 with a standard error of 0.18 for the question on scheduling computer use. The question on the use of the computer as a tool resulted in a mean of 4.46 with a standard error of 0.20. These results show that the inservice teachers surveyed indicate a positive attitude toward scheduling student use of computers and using computers as a tool.

T-tests. T-tests were performed on the data to determine if there were significant differences between the responses to the two questions by the preservice and

inservice teachers. For the question regarding attitudes toward scheduling computer use, the t-test indicates a significant difference ($p > .05$) in the responses of the preservice and inservice teachers. For the question regarding the attitudes toward using the computer as a tool, the t-test indicates a significant difference ($p > .01$) in the responses of the preservice and inservice teachers. The t-test results indicate that preservice and inservice teachers surveyed have different attitudes toward scheduling computers and using them as a tool. Reexamination of the means of these two groups indicates that the preservice teachers have a more positive attitude toward the two areas surveyed.

Conclusions

Conclusion 1. The hypothesis that teachers will have a positive attitude toward the computer as a tool in a classroom is accepted. The means for both the preservice and inservice teachers are greater than the midpoint of 4.00 thereby indicating a positive attitude.

Conclusion 2. The hypothesis that teachers will have a negative attitude toward the logistics of classroom use of computers is rejected. The means for both the preservice and inservice teachers are greater than the midpoint of 4.00 thereby indicating a positive attitude.

Conclusion 3. The hypothesis that pre-service teachers will have more positive attitudes than in-service teachers

toward the computer as a tool in a classroom is accepted. The t-test comparing the two groups indicates a significant difference between the two groups and an examination of the means shows the preservice teachers have a more positive attitude.

Conclusion 4. The hypothesis that pre-service teachers will have more positive attitudes than in-service teachers toward the logistics of classroom use of computers is accepted. The t-test comparing the two groups indicates a significant difference between the two groups and an examination of the means shows the preservice teachers have a more positive attitude.

Based on the data collected in this sample, it can be concluded that teachers do consider the computer to be a simple, flexible and accessible tool. Because the survey sample was limited to Washington State University students, a further sample of inservice teachers, including those with more years experience, should be conducted to validate the conclusions of this study for a wider population.

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APPENDIX A

TEACHER ATTITUDES TOWARD COMPUTER USE IN THE CLASSROOM

To provide demographic data of the survey respondents, please indicate the most appropriate answer to describe yourself at this time.

1. I am a male female .

2. I teach _____ .
(Grade(s) and subject)

3. I have taught for ____ years. (include substituting)
(number)

4. Involvement with computers on a personal level. (not work related)

None	Little	Somewhat	Much	A Great Deal
1	2	3	4	5

5. Involvement with computers on a professional level. (work related)

None	Little	Somewhat	Much	A Great Deal
1	2	3	4	5

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We are interested in determining <u>your feeling toward scheduling arrangements and instructional use of computers in the classroom</u>. For each, please indicate your perception by placing an X in the space closest to the adjective which represents your feeling. Make separate and independent judgments for each of the adjective pairs. The closer you place your X toward one adjective or the other, the more you think that adjective better describes the scheduling

arrangement and instructional use of computers in classrooms.

There are no right or wrong answers. Respond to the adjectives rapidly and be guided by your first impressions.

1. Scheduling computers for student use.

convenient __:__:__:__:__:__:__ inconvenient
impossible __:__:__:__:__:__:__ feasible
rigid __:__:__:__:__:__:__ flexible
spontaneous __:__:__:__:__:__:__ laborious
troublesome __:__:__:__:__:__:__ trouble free
unwieldy __:__:__:__:__:__:__ manageable
simple __:__:__:__:__:__:__ complex
difficult __:__:__:__:__:__:__ easy
adaptable __:__:__:__:__:__:__ inflexible
convenient __:__:__:__:__:__:__ time consuming
versatile __:__:__:__:__:__:__ limited
confusing __:__:__:__:__:__:__ clear
efficient __:__:__:__:__:__:__ awkward
complicated __:__:__:__:__:__:__ easy
reliable __:__:__:__:__:__:__ not dependable
uncertain __:__:__:__:__:__:__ available
unavailable __:__:__:__:__:__:__ handy
obtainable __:__:__:__:__:__:__ out of reach

There are no right or wrong answers. Respond to the adjectives rapidly and be guided by your first impressions.

2. Using computers as an instructional tool.

convenient __:__:__:__:__:__:__ inconvenient
impossible __:__:__:__:__:__:__ feasible
rigid __:__:__:__:__:__:__ flexible
spontaneous __:__:__:__:__:__:__ laborious
troublesome __:__:__:__:__:__:__ trouble free
unwieldy __:__:__:__:__:__:__ manageable
simple __:__:__:__:__:__:__ complex
difficult __:__:__:__:__:__:__ easy
adaptable __:__:__:__:__:__:__ inflexible
convenient __:__:__:__:__:__:__ time consuming
versatile __:__:__:__:__:__:__ limited
confusing __:__:__:__:__:__:__ clear
efficient __:__:__:__:__:__:__ awkward
complicated __:__:__:__:__:__:__ easy
reliable __:__:__:__:__:__:__ not dependable
uncertain __:__:__:__:__:__:__ available
unavailable __:__:__:__:__:__:__ handy
obtainable __:__:__:__:__:__:__ out of reach